

Stockpile Stewardship

Attending to Stockpile Needs

As a principal participant in the Department of Energy's Stockpile Stewardship Program, Livermore is committed to maintaining confidence in the safety and reliability of the U.S. nuclear weapons stockpile. The program is extraordinarily demanding because the nuclear weapons in the stockpile continue to grow older, and we are challenged to ensure their performance and refurbish them as necessary without conducting nuclear tests.

The Stockpile Stewardship Program integrates the activities of the DOE nuclear weapons complex, which includes Livermore, Los Alamos, and Sandia national laboratories as well as four production sites and the Nevada Test Site.

Certifying Stockpile Safety and Reliability


The objective of the Stockpile Stewardship Program is to provide the President of the United States with accurate assessments of the safety, reliability, and performance of each weapon system in the nation's nuclear stockpile. We provide these assessments through a formal annual certification process that relies critically on the expertise and capabilities of Livermore, Los Alamos, and Sandia national laboratories and their independent evaluations.

In 1999, the laboratories completed the technical reviews that provided the basis for the fourth certification of the stockpile for the President. Subsequently, the secretaries of Energy and Defense certified to the

President that the U.S. nuclear stockpile is safe and reliable and that no nuclear tests are needed.

Stockpile Stewardship Program "On Track"

In December 1999, a 30-Day Review of the Stockpile Stewardship Program concluded that the program's structure is "on track" and that "science-based stewardship is the right path." The review was commissioned by Secretary of Energy Bill Richardson to examine accomplishments and program structure to ensure that current and long-term needs for certifying the stockpile can be met. The specific findings of the review will help shape future decisions in the program to manage technical challenges and requirements, which will increase as the stockpile continues to age.



The technician (top) uses a solid-phase microextractor to collect samples of gases produced by organic materials in a weapon. The sample is then desorbed in the injection port (above and right) of a gas chromatograph-mass spectrometer, which identifies the compounds and measures their amounts. The analysis provides indications of material aging.



"The past year has been rough, but it is time to regroup and move forward with a strong focus on our mission," DOE Secretary Bill Richardson told Livermore employees in December. His visit followed high-level reviews of the Stockpile Stewardship Program and security improvements at the Laboratory.

Prior to the review, and with input from the laboratories and production facilities, the DOE Office of Defense Programs undertook a major shift in management strategy in response to evolving demands on the program. The revision recasts major elements of the Stockpile Stewardship Program into a set of activities that more clearly establish program goals and budget priorities and help to identify program risks if there are budget shortfalls. Integrated program activities include:

• **Directed Stockpile Work.**

These activities support the readiness of weapons and include activities to meet stockpile requirements. We have special responsibilities for the weapon systems that were designed at Livermore: the W87 and W62 ICBM warheads, the B83 bomb, and the W84 cruise missile.

• **Campaigns.** Campaigns are directed at making the scientific and technological advances necessary to assess and certify weapon performance over the long term without nuclear testing. Each of the 18 campaigns has well-defined, specific deliverables on which its research and development efforts are focused.

• **Readiness in Technical Base and Facilities.**

Readiness requires investments to be made in people, special experimental facilities, and supporting infrastructure to conduct the program today and to have in place the needed capabilities as more challenging stockpile issues arise in the future.

Refurbished Warhead Meets Requirements

In June 1999, Livermore's W87 Life Extension Program met the Air Force's Initial Operational Capability (IOC)



Now on Peacekeeper missiles, the W87 warhead/Mk21 reentry vehicle (RV) is a candidate for a single RV in the Minuteman III ICBM under the START II Treaty. Development activities to refurbish the W87 and extend its life included extreme environmental testing such as transportation and handling shocks, temperature changes, and missile launch and flight conditions.

requirement. The first refurbished unit was completed at the Pantex Plant in February 1999, and a significant number of refurbished W87 units have already been delivered. Refurbishment of the W87 ICBM warhead, the design with the most modern safety features in the stockpile, extends the lifetime of the weapon to beyond 2025. We completed all development activities, which have included flight testing, ground testing, and physics and engineering analysis. No additional nuclear

testing of the W87 is required to prove system reliability after the refurbishment. Assessment of nuclear performance is based on computer simulation, past nuclear tests, and new above-ground experiments that address specific physics issues.